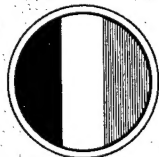
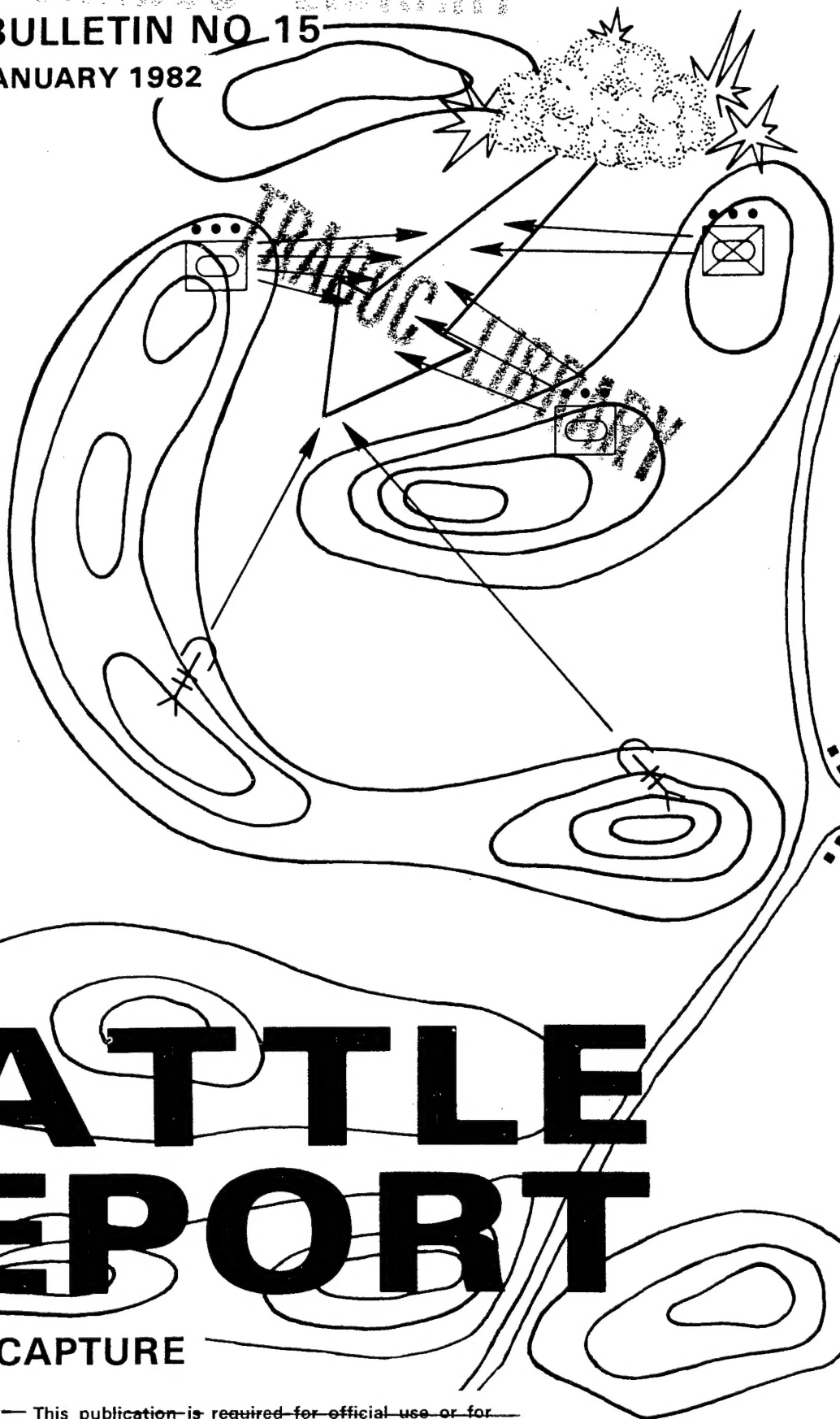


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TRADOC BULLETIN NO. 15

22 JANUARY 1982



BATTLE REPORT

SQUELCH CAPTURE

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**UNITED STATES ARMY
TRAINING AND DOCTRINE COMMAND**

BULLETIN NO 15

**BATTLE REPORT:
SQUELCH CAPTURE**

Battle reports are intended to provide timely, technical information on weapons, tactics, and training to commanders and others concerned with military training. They are not intended to supplant doctrinal publications, but to supplement how-to-fight material with data derived from tests, recent intelligence, and other sources.

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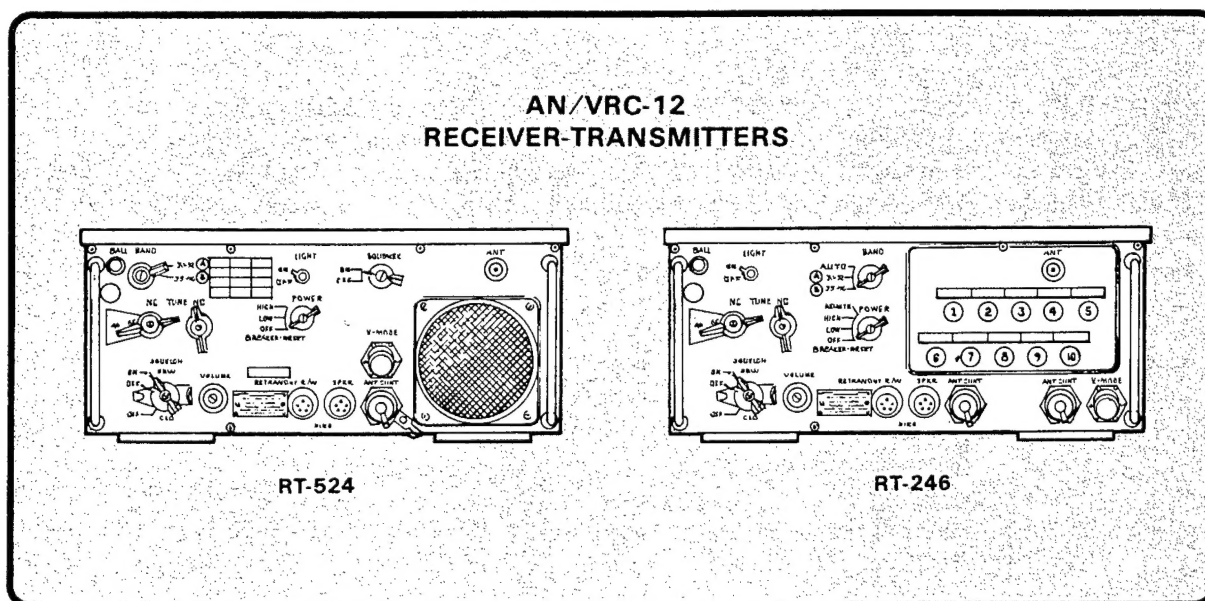
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When used in this publication, "he," "him," "his," and "men" represent both the masculine and feminine genders unless otherwise stated.

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Introduction

Various electronic devices will be used on the modern battlefield to command and control operating forces and weapon systems. The enemy will attempt to disrupt, destroy, and deceive friendly command and control by means of electronic combat. This report informs Army operating forces of problems created by Threat interference of communications nets and its effect on command, control, and communication capabilities. It specifically addresses Warsaw Pact VHF jamming capabilities used against the US AN/VRC-12 series radios—the radios used most frequently in US Army tactical units. Included are actions that individuals and units can take to combat VHF jamming and countermeasures now being considered by the Department of the Army.

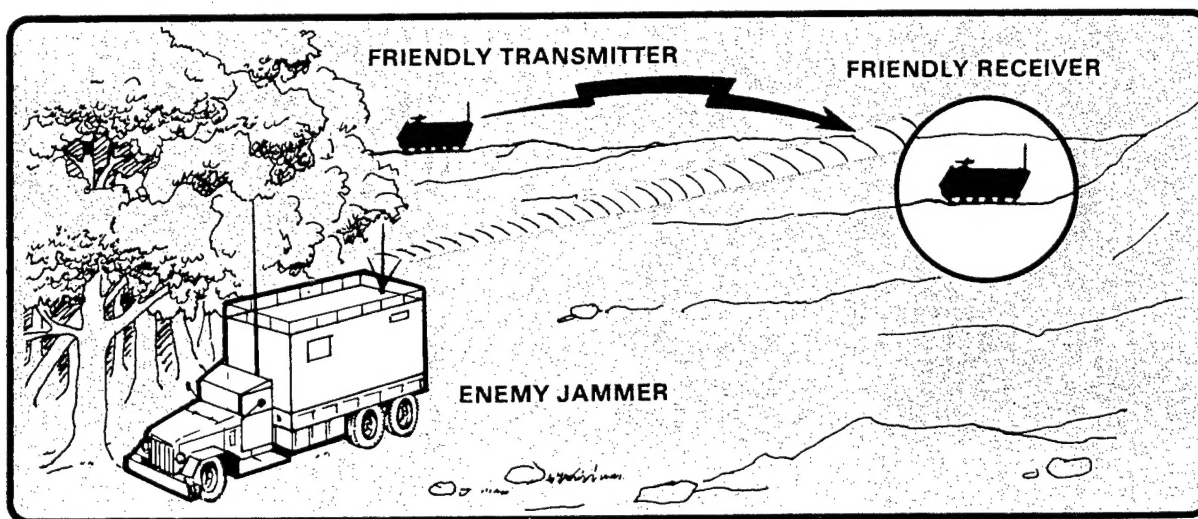


What is Squelch Capture?

Squelch capture is the capability of some Threat jammers to prevent friendly communications from being received on VRC-12 series radios. It is one of the most serious threats to US military tactical FM communications. While all enemy jammers pose a threat to communications, some have a more serious effect than others. In the case of VRC-12 series radios, Threat jammers are able to transmit signals that prevent friendly transmissions from being heard without the victim operator knowing that his radio is being jammed. The effect on the VRC-12 radio receiver from this type of jamming is called the squelch-capture effect.

HOW IT OCCURS

The VRC-12 receiver is activated by a control tone that, when received, deactivates the noise squelch control and allows the operator to hear incoming transmissions. In other words, when the microphone switch is depressed, a signal from the VRC-12 transmitter electronically opens the intended receiver so voice transmissions can be heard. The signal cannot be heard by the operator. When squelch capture occurs, the jammer blocks out the control tone so that the receiver never opens, and, therefore, no communications are received. When the squelch control is in the *on* position, no sound at all is heard at the receiver. When it is in the *off* position, a slight increase in the rushing sound may be heard when it is jammed. The jammer also prevents the *call light* from illuminating. Although VRC-12 series radios are designed to limit outside radio interference, they are extremely vulnerable to squelch capture. The following illustrates how an enemy jammer can be effective against friendly communications.



HOW IT IS IDENTIFIED

Although the operator of the VRC-12 radio may be unaware that his radio receiver is being jammed, he should be suspicious *if the receiver call light does not illuminate and if he does not receive any radio transmissions for long periods of time*. If he does suspect jamming, he can confirm this by switching to other radio frequencies to check radio traffic on other communications nets. If he can hear transmissions on other frequencies, he can assume that his radio frequency has been jammed (captured). He should report this, up through the chain of command, so that the appropriate action can be taken, such as changing to an alternate radio frequency.

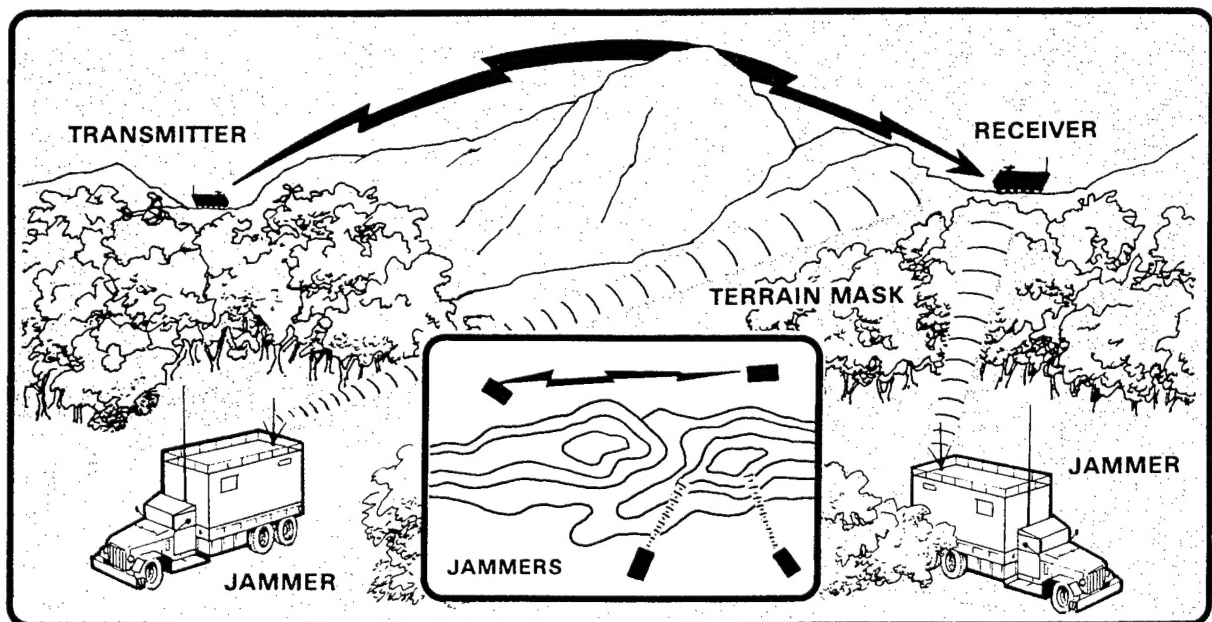
How to Counter Squelch Capture

Many Army publications contain information about countermeasures to use if a radio frequency is jammed. Operator manuals for radios, field SOPs, and other current documents describe techniques to counteract jamming. For the most part, these publications cover jamming signals an operator can hear over a VRC-12 receiver, and the actions described in them are still valid. But, since Threat jammers are able to block out VRC-12 radio receiver signals, operators must know what actions to take when nothing can be heard.

WHAT UNITS SHOULD DO

Commanders must train radio operators on specific actions to take when they experience long periods without receiving communications. Some of those actions follow:

- Site radio equipment properly and use terrain for masking.

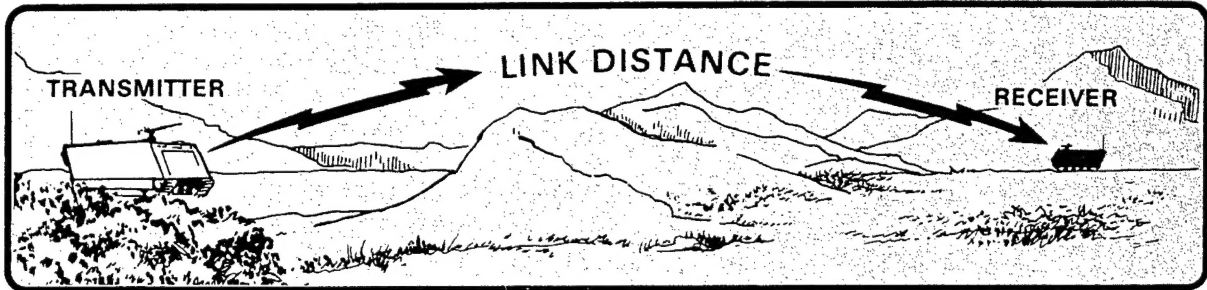


(Since jammers are line of sight to the targeted receiver, their effect can be severely hindered through good terrain masking.)

- Use an alternate method of communicating, such as messenger, land-line, wire, or high frequency communications, when available.

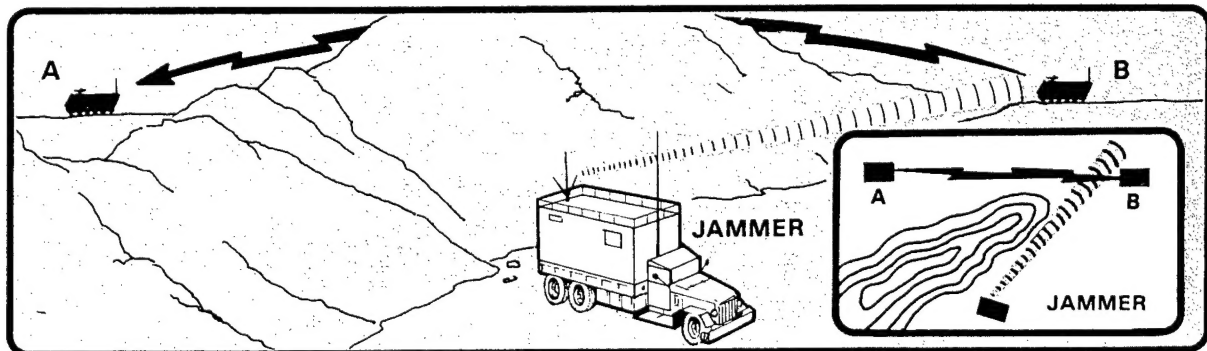
(An alternate method will already have been identified if detailed prior planning and coordination have been accomplished.)

- Establish shorter link distances between stations to reduce jamming effectiveness.



(Link distance is the distance between a transmitter and receiver operating on the same frequency. The two significant variables used to determine jamming range are link distance and the distance between the jammer and the target receiver.)

- Transmit critical messages in the blind when contact with another station cannot be made.



*(Remember, **transmitters** are not jammed, and other stations in the communications net may not be in the line of sight of enemy jamming equipment.)*

For example, the graphic above shows a situation where an enemy jammer has effectively jammed station B. Even so, station A can receive messages from station B because the hill mass between the two stations prevents the enemy jammer from getting radio line of sight with station A's receiver. Once received, station A can transmit the message to its destination or relay it.

- Employ other tactics as discussed in TC 32-11, How to Get Out of A Jam.

WHAT SERVICE SCHOOLS SHOULD DO

Until VRC-12 series radios are provided a jamming recognition capability, service schools must emphasize techniques to combat the squelch-jamming-capture effect. Also, the schools must insure that programs of instruction (POI) include a detailed description of squelch capture.

WHAT DA IS DOING

The effects of electronic jammers on VRC-12 radio receivers, as presented in this report, and their impact on equipment improvement are of extreme importance. Therefore, existing VRC-12 series radios and future equipment must be updated to provide them with a jamming recognition capability. Among the actions initiated to accomplish this are the following:

The commander of the Communications-Electronics Command (CECOM) has submitted an equipment product improvement proposal to the Department of the Army for VRC-12 series radios. The proposal, currently awaiting DA approval and allocation of funds, would provide radio operators with an audiovisual indication of a jamming signal.

DA action is underway to raise the priority of the steerable null antenna processor (SNAP-1) for expeditious fielding. The SNAP-1 appears to be a solution to squelch capture since it can detect incoming signals during jamming and the VRC-12 receiver cannot.

Summary

Electronic jamming operations have been used and will be used in the future to alter the course of battle. Because of the importance of jammers as weapon systems, the enemy will continue to use jamming against US military tactical communications. Survival and mission success in a modern battlefield environment require that all personnel be able to recognize and defeat enemy jamming efforts against them. Radio operators must use countermeasures to combat the effects of jamming. Although they do not provide a guarantee, countermeasures will reduce friendly vulnerability and increase the probability of successful communications.

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GLENN K. OTIS
General, United States Army
Commanding

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